

REMARKS

As a preliminary matter, the office action notes that some certified copies of the priority documents have been received. Applicants claim priority based on JP 2000-137571, and filed a certified copy of that application. Applicants did not claim priority based on JP 2001-072727, also identified in the Declaration. Accordingly, applicants request acknowledgment that all certified copies have been received.

Claim 1 now includes the features of claim 3, claim 8 now includes the features of claim 10, and claim 18 now includes the features of claim 19. For this reason, applicants will address the rejections of claims 3, 10 and 19, and the remaining claims which depend from independent claims 1, 8 and 18. Those rejections are based on US '225 and other references.

In amended claims 1, 8 and 18, nitrogen is distributed in an inclined concentration in the carbonaceous protective layer, and the nitrogen concentration is gradually increased from a bottom surface side to a top surface side in the carbonaceous protective layer.

In page 3 of the office action, the examiner mentioned that US '225 teaches a layer having a nitrogen distribution as in claims 3 and others. However, US '225 does not teach that a nitrogen concentration is gradually increased from a bottom surface side in the carbonaceous protective layer.

In US '225, a layer of diamond-like carbon (DLC) is doped with a dopant (nitrogen). This means that nitrogen is selectively doped in an upper portion of the DLC

layer. Apparently, no gradual increase in the nitrogen concentration from the substrate is obtained in the resulting nitrogen-doped DLC layer of US '225.

According to US '225, adhesion of a lubricant layer to the DLC layer will be improved as a result of nitrogen doping. However, due to selective doping of the nitrogen in the upper portion of the DLC layer, hardness of the DLC layer is reduced because a large amount of the nitrogen is doped into the DLC layer. Contrary to US '225, according to the present invention, good adhesion of the lubricant layer to the carbonaceous protective layer can be obtained while inhibiting a reduction of the layer hardness in the carbonaceous layer as a result of the controlled addition of nitrogen, as is disclosed in, for example, page 6, lines 27 to page 7, line 8, of the specification. Withdrawal of this rejection, and the rejection of the dependent claims, is respectfully requested.

For the foregoing reasons, applicants believe that this case is in condition for allowance, which is respectfully requested. The examiner should call applicants' attorney if an interview would expedite prosecution.

Respectfully submitted,

GREER, BURNS & CRAIN, LTD.

By 

Patrick G. Burns

Registration No. 29,367

May 12, 2003
300 South Wacker Drive
Suite 2500
Chicago, Illinois 60606
Telephone: 312.360.0080
Facsimile: 312.360.9315